This symbol adjacent to one or more terminals identifies them as being associated with ranges that may in normal use be subjected to particularly hazardous voltages.
For maximum safety, the instrument and its test leads should not be handled when these terminals are energized.

This marking indicates that equipment is protected completely by the double insulation.

2. Introduction

This meter is 3½ digit digital multimeter that is rugged, reliable and convenient to use, while providing all the accuracy and features needed for any application. It performs capacitance, resistance, diode & continuity measurement.
It is designed for the professional at work in the field or hobby & home application.

3. Features

- ☆ 4 Functions/19 Measuring Ranges
- ☆ Surface Mounted PCB Assembly
- ☆ 10M ohm Input Impedance
- ☆ Large LCD with pF to mF Annunciator
- ☆ 600V rms AC input protection on Ω range
- ☆ Low 20Ω Test with Zero Adjust V/R equipped
- ☆ 2000㏀ max. Resistance Meaurement
- ☆ Low 200㎊ Test with Zero Adjust V/R equipped
- ☆ 20mF max. Capacitance Measurement
- ☆ Two Test Methods by Built - In socket & Test Lead on Capacitance Measurement.
- ☆ Fuse protection on Capacitance Range
- ☆ Double Insulated Safety Input Jack
- ☆ Tilt Stand (Convertible to Hanger) equipped
- ☆ IEC 1010-1 OVER VOLTAGE CATEGORY Ⅱ

4. Specification

4-1. General Specification

Display	3 ½ LCD 0.87" height, max. reading of 1999 with annunciators.
Polarity	Automatic "—" is displayed
Overrange Indication	'1' on LCD is displayed.
Low Battery Indication	'⊏⊐' sign on LCD readout.
Operation Temperature	0℃ to 50℃ less than 80% relative humidity up to 35℃ less than 70% relative humidity from 35℃ to 50℃
Storage Temperature	-15℃ to 50℃
Temperature Coefficient	0℃ to 18℃ and 28℃ to 50℃ less than 0.1x applicable accuracy specification per ℃
Power	9V Alkaline or Carbon Zinc battery (NEDA 1604)
Battery Life (typical)	100 hours with carbon zinc cells 200 hours with alkaline cells
Dimension	72W x 156L x37D mm
Weight	approx. 205g
Accessories	Safety Test Lead 1 pair Operator's Manual 1pc.

4-2. Measurement Specification

Accuracy of specifications apply for 1 year after purchase when operated in a temperature of 18℃ to 28℃ (64°F to 82°F)and a relative humidity less than 75%.
Basic electrical specifications are given as ± ((% of reading)+(number of least significant digits))

Capacitance

Range	Resolution	Accuracy	Test Frequency
200㎊	0.1㎊	±(0.5% of rdg+1dgt+0.5㎊)	
2㎋	1㎊	±(0.5% of rdg+3dgt)	
20㎋	10㎊	〃	820㎐
200㎋	100㎊	〃	
2㎌	1㎋	〃	
20㎌	10㎋	〃	82㎐
200㎌	100㎋	〃	
2000㎌	1㎌	±(1.0% of rdg+1dgt)	8.2㎐
20mF	10㎌	±(1.5% of rdg+1dgt)	

Test Voltage; < 3.5V, Input Protection : 0.1A / 250V Fuse

Resistance

Range	Resolution	Accuracy	Input Protection
20 Ω	0.01 Ω	±1.2%of rdg(Zero Adjusted)	
200 Ω	0.1 Ω	±(0.8%of rdg+4dgt)	
2K Ω	1 Ω	〃	
20K Ω	10 Ω	〃	Protected by PTC (600V rms)
200K Ω	100 Ω	〃	
2M Ω	10K Ω	±(1.5%of rdg+5dgt)	
20M Ω	100K Ω	±(2.0%of rdg+10dgt)	
2000M Ω	1M Ω	±((5%-9)of rdg+10dgt)	

Cotinuity Test

Range	Threshold	Continuity beeper	Response Time
•))	30 Ω	4.0KHz	<100ms

DIODE TEST

Measures forward resistance of a semiconductor junction in K Ohm at max. test current of 1.5mA.

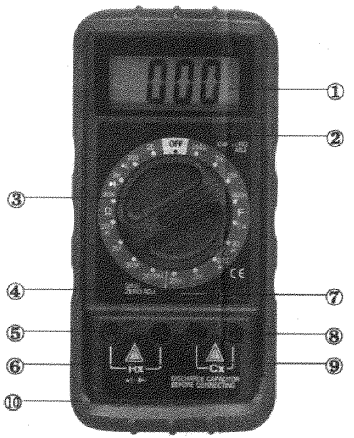
5. Operation

5-1. Preparation and Caution before measurement

1. Function switch should be set to the range to be measured before operation. If the function must be switched during a measurement, always remove the test leads from the circuit being measured.
2. If the unit is used near noise generated equipment, be aware that the display may become unstable or indicate large errors.
3. Avoid using the unit in places with rapid temperature variations.
4. In order to prevent damage or injury to the unit, never fail to keep the maximum tolerable voltage and current.
5. Carefully inspect test lead. If damaged, discard and replace.

5-2. Front Panel Description

1. Liquid Crystal Display
2. 200 pF Zero Adjust V/R
3. Function/Rotary Switch
4. 20 Ω Zero Adjust V/R
5. Ω red input jack
6. Ω common input jack
7. Capacitance test socket
8. Cx red input jack
9. Cx common input jack
10. Holster (OPTION)



5-3. How to Make Measurement

(1) Capacitance Measurement

WARNING ⚠

Discharge all voltage from the capacitor before measuring the value

1. Set function/rotary switch to desired capacitance position.
2. Short the leads of the capacitor (via 100K Ω resistor)to insure there is no charge on the capacitor.
3. Plug red test lead into Cx red input jack, and black one into Cx common input jack
4. Apply test lead tips to the capacitor lead.
   - Observe correct polarity when measuring electrolytic capacitor.
5. Read the capacitor value on digital display.

NOTE; For 200pF measurement, use Zero adjust V/R to eliminate test lead capacitance

NOTE; Small value capacitors can also be measured by built-in test socket in the meter.

(2) Resistance Measurement

1. Plug red test lead into 'Rx red' input jack and black one into 'Rx common' input jack.
2. Set function/rotary switch to desired 'Ω' position.
3. If the resistance being measured is connected to a circuit, turn off power to the circuit being tested and discharge all capacitors.
4. Connect test leads to the circuit being measured.
   when measuring high resistance, be sure not to contact adjacent point even if insulated, because some insulators have a relatively low insulation resistance, causing the measured resistance to be lower than the actual resistance.
5. Read resistance value on digital display.
6. For 20 Ω measurement, Zero adjust V/R allows you to eliminate test lead resistance. Short the test lead and adjust V/R knob until the display reads zero.

(4) Diode Test

1. Plug red test lead into 'Rx red' input jack and black one into 'Rx common' input jack.
2. Set function/rotary switch to '⊣◁'
3. If the semiconductor junction being measured is connected to a circuit, turn off power to circuit being tested and discharge all capacitors.
4. Connect test leads to the device and read forward value on digital display.
5. If the digital display reads overrange(i), reverse the lead connections. The placement of test leads when forward reading is displayed indicates the orientation of diode.
   The red lead is positive and the black lead is negative. If overrange(I) is displayed with both lead connections, the junction is open.

(5) Continuity Test

1. Plug red test lead into 'Rx red' input jack and black one into 'Rx common' input jack.
2. Set function/rotary switch to '•))'
3. Buzzer sounds if the resistance between two leads is less than approx. 30 ohms.

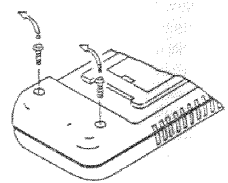
6. Maintenance

Warning

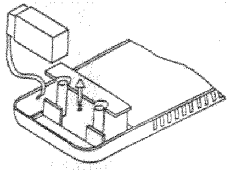
Before attempting battery & fuse removal or replacement, disconnect test leads from any energized circuits to avoid hazard.

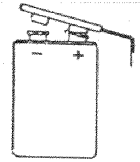
6-1. Battery Replacement

1. Replace battery when '▭' appears on the display.
2. Remove 2 screw on the bottom case, then detach it from the top case.



3. Unsnap the battery from the connector, and replace with new 9 volt battery.
4. Wind the excess lead length around battery clip, and install battery.





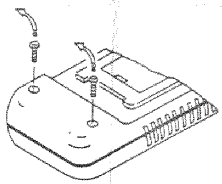
5. Close the bottom case and secure with screw.

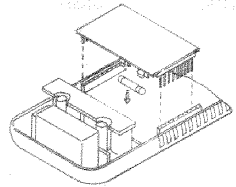
Caution

Failure to turn off the DMM before installing the battery could result in damage to the meter if the battery is connected to the battery terminal incorrectly.

6-2. Fuse Replacement

1. This meter is provided with 0.1A/250V protect the capacitance measuring circuits
2. Turn off power.
3. Remove the screw on the bottom case.
4. Detach the bottom case from the top case.
5. Disconnect sub-PCB from 9 pin female header carefully.
6. Remove the fuse from the holder and replace with new same specified fuse.
7. Close the bottom case, and secure with screw.





Warning

Use only an equivalent fuse to the one specified. Use of incorrect fuse could result in serious injury or meter damage

6-3. Calibration procedures

Adjustment should be done with highly accurate standard (better than 0.1% accuracy).

1. Remove the screw on the bottom case, and detach bottom case from top case carefully.
2. With the meter operating, set function/rotary switch to the 2μF range, and apply 1μF from accurate source. With a small screw driver inserted into the semi-variable resistor VR3, carefully turn it until the reading obtains 1.000μF.

7. Using the Tilt Stand

Propping Up the Meter

This meter has the tilt-stand at back side to help providing a better viewing angle.

To use the tilt-stand as a prop, just open it away from the meter and set it on a flat surface.

Hanging Up the Meter

To hang up the meter remove tilt-stand carefully by pressing inward, and then insert it into 2 holes at the upper part.